



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

August 11, 1999

MEMORANDUM

SUBJECT: **Methamidophos: Review of Potato Processing Study**; Chemical ID No. 101201; Reregistration Case No. 0043; MRID 44815406; DP Barcode No. D256034

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In response to previous reviews on the organophosphate insecticide methamidophos, Bayer Corporation has submitted a potato processing study. This study was required in the residue chemistry chapter to the Reregistration Eligibility Decision (RED) (F. Fort, 10/29/98).

Tolerances are established in 40 CFR 180.315 for residues of methamidophos *per se* in/on numerous commodities including potatoes at 0.1 ppm. Methamidophos is a metabolite of the insecticide acephate, and therefore may be present on crops as a result of acephate use. There are no registrations for use of acephate on potatoes.

CONCLUSIONS AND RECOMMENDATIONS

The registrant has submitted an acceptable potato processing study and no further potato processing data are required. Potatoes were treated with methamidophos at a rate five times the maximum rate. Residues on the raw agricultural commodity (RAC), potato granules, dried potato slices, and dried potato peel were non-detectable. Non-quantifiable residues were found in wet potato peel. The residues in potato granules, dried potato slices, and potato peel should be assumed to be equal to the RAC in future risk assessments. Residues at twice the limit of quantitation were found in potato chips. Because residues in the RAC were non-detectable, the concentration factor in chips could not be exactly determined, but was estimated to be 10x. This is based on an estimate of the limit of detection for the method. HED recommends that a tolerance of 0.5 ppm be established in/on potato chips. Although some irregularities were noted with sample storage and processing, previous storage stability studies indicated that residues of methamidophos are stable in potato processed products for at least two years. Therefore HED concludes that these actions did not likely affect the overall conclusions of the study.

DETAILED CONSIDERATIONS

Bayer Corporation (formerly Miles) has submitted a study describing the Magnitude of Residue of Methamidophos on potato processed commodities (1994; MRID No. 44815408).

Application and Crop History The field portion of the study was conducted in 1990. Monitor 4, a liquid flowable formulation of methamidophos, was applied 10 times to potatoes grown in CA at an exaggerated rate of 5 lb ai/A/application. This rate is equivalent to 5 times the maximum labeled rate. Potatoes were harvested 14 days after the final application. The potatoes were delivered to the National Food Laboratory in CA on the day of harvest.

Processing Treated samples were stored for six days at 21 °C prior to processing. Potatoes were washed in chlorinated water and were then peeled. The peel was retained for further analysis by the laboratory. The peeled potatoes were washed and separated into three fractions. The first fraction was sliced, blanched, and fried to yield potato chips. The other two fractions were initially diced, cooked, and mashed. The second fraction was then dried and ground into seed granules. The seed granules were blended with the mashed potatoes from the third fraction. The blended fraction was tempered, dried, and ground into potato granules.

Although a good chronological general listing of study events was included in Appendix 3 to the report, some of the storage and processing procedures in the processing laboratory are unclear. For example, it appears that processing of the treated potatoes was suspended for a month (8/27/90 to 9/25/90) in the middle of the granule production process. The Standard Operating Procedure specifies that fractions are placed into frozen storage within two hours of production. It is also unclear when the sub-sample of the raw, unwashed potatoes was placed into frozen storage for later analysis. Frozen samples of the raw, unwashed potatoes, peel, potato chips, and potato granules were sent to Miles.

One month after receiving the potato, granule, and chip samples, Miles shipped them to ABC labs for analysis. However the peel samples were sent almost six months later. No explanation is provided in the report for the delay. ABC labs dried samples of the peel and sliced potatoes to a constant weight in a laboratory oven at 65-84°C to obtain a sample for analysis. The lab calculated the percent moisture in the peel sample to be 85%.

Analytical Method Mobay Method No. 34047 was used for the analysis of the samples. The samples were blended with ethyl acetate and anhydrous sodium sulfate. The extracts were filtered and evaporated to dryness. The potato chip samples required an extra hexane/acetonitrile partitioning step to remove the oil. The chip sample extracts were further cleaned-up with gel permeation chromatography. Extracts were analyzed by gas chromatography with thermionic-specific detection.

Quantitation was by single-point external standard, using a standard equivalent to a 0.1 ppm concentration in the sample. The lab conducted a linearity check with spiked extracts of the individual matrices and reported a limit of quantitation (LOQ) of 0.01 ppm. Fortifications at the LOQ were conducted only for the tubers and granules; the minimum fortification level for all other matrices was 0.1 ppm. The limit of detection was not reported. Results of the method validation and concurrent recovery samples are reported in Table 1.

Table 1. Results of Method Validation and Concurrent Recoveries

Commodity	Fortification Level, ppm	Residues of Methamidophos found, ppm	Percent Recovery
Tubers	0.01	0.008	80
	0.01	0.010	100
	0.02	0.024	120
	0.05	0.035	70
	2.0	2.043	102
Granules	0.01	0.012	120
	0.01	0.011	110
	0.02	0.018	90
	0.05	0.055	110
Chips	0.1	0.109	103
Wet Peel	0.1	0.097	97
Dry Peel	0.1	0.104	104
Dried Potatoes	0.01	0.007	70
	0.01	0.007	70
	0.02	0.019	95
	0.05	0.059	118

Storage Stability

Samples were stored up to an interval of 275 days. The Residue Chemistry Chapter to the RED (F. Fort, 10/29/98) concludes that residues of methamidophos in potato tubers, granules, and dry peel are stable for at least 24 months.

Results of Analysis

Control samples generally showed non-detectable residues, with the exception of the potato chip control, which showed residues of 0.006 ppm. Results of the treated sample analysis and estimated concentration factors are presented in Table 2.

Table 2. Residues of Methamidophos in Processed Products from Potatoes (5x)

Commodity	Residues of Methamidophos, ppm	Concentration Factor
Tubers	<0.01, ND ¹	--
Granules	<0.01, ND	≤ 1
Chips	0.02	approx. 10 (see below)
Wet Peel	<0.01	≤ 1
Dry Peel	<0.01, ND	≤ 1
Dried Potato	<0.01, ND	≤ 1

¹ ND = not detected

Because the residues in the raw agricultural commodity (RAC) were not detected, the concentration factor in potato chips could not be determined. The minimum amount detected in any sample (wet peel) was equivalent to 0.002 ppm, assuming linearity below the LOQ. If this value is used at the limit of detection, and assuming the residues in the RAC were equivalent to this value, then the estimated concentration factor for potato chips is 10x.

cc: CLOlanger (RRB1), F. Fort, Reg Std. File
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RDI: WHazel: 7/21/99 CSwartz: 7/21/99 FFort: 7/21/99